

1 CLAIMS

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3 1. Apparatus for presenting a highly spatially accurate
4 visualisation of a scene from which measurements can
5 be taken, the apparatus comprising:

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7 at least one camera for recording a plurality of
8 frames of video images of the scene;

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10 at least one sensor mounted in relation to the
11 camera for recording sensor data on positional
12 characteristics of the camera as the at least one
13 camera is moved with respect to the scene; and

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15 image processing means including a first module for
16 synchronising the frames with the sensor data to
17 form corrected frames; and a second module for
18 constructing an accurate mosaic from the corrected
19 frames.

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21 2. Apparatus as claimed in Claim 1 wherein the at least
22 one camera is a video camera capturing 2 dimensional
23 digital images.

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25 3. Apparatus as claimed in Claim 1 or Claim 2 wherein
26 the at least one sensor comprises a sensor capable
27 of making a positional measurement.

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29 4. Apparatus as claimed in Claim 3 wherein the at least
30 one sensor comprises a digital compass.

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32 5. Apparatus as claimed in Claim 3 or Claim 4 wherein
33 the at least one sensor comprises an altimeter
34 and/or bathymetric sensor.

- 1
- 2 6. Apparatus as claimed in any preceding Claim wherein
- 3 the camera(s) and sensor(s) are mounted on a moving
- 4 platform.
- 5
- 6 7. Apparatus as claimed in any preceding Claim wherein
- 7 the apparatus further includes a calibration system
- 8 from which the at least one camera is calibrated.
- 9
- 10 8. Apparatus as claimed in any preceding Claim wherein
- 11 the first module performs a perspective correction
- 12 to the images using the sensor data.
- 13
- 14 9. Apparatus as claimed in any preceding Claim wherein
- 15 the second module accomplishes video mosaicing via a
- 16 correlation technique based on frequency contents of
- 17 the images being compared.
- 18
- 19 10. Apparatus as claimed in any preceding Claim wherein
- 20 the apparatus further includes display means for
- 21 providing a visual image of the mosaic.
- 22
- 23 11. Apparatus as claimed in any preceding Claim wherein
- 24 the apparatus further comprises data storage means
- 25 to allow the mosaic to be stored.
- 26
- 27 12. Apparatus as claimed in any preceding Claim wherein
- 28 the apparatus includes a graphic user interface
- 29 (GUI).
- 30
- 31 13. A method for presenting a highly spatially accurate
- 32 visualisation of a scene from which measurements can
- 33 be taken, the method comprising the steps;
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- 1 (a) recording a plurality of frames of video images
2 of the scene from a camera;
- 3 (b) recording sensor data on positional
4 characteristics of the camera as the camera is
5 moved with respect to the scene;
- 6 (c) synchronising the frames with the sensor data
7 to form corrected frames; and
- 8 (d) constructing an accurate mosaic from the
9 corrected frames.
- 10
- 11 14. A method as claimed in Claim 13 wherein the method
12 includes the step of calibrating the camera prior to
13 step (a).
- 14
- 15 15. A method as claimed in Claim 13 or Claim 14 wherein
16 the synchronisation step includes the step of
17 performing a perspective correction to the images
18 using the sensor data.
- 19
- 20 16. A method as claimed in any one of Claims 13 to 15
21 wherein the step of video mosaicing is achieved
22 using a correlation technique based on frequency
23 contents of the images being compared.
- 24
- 25 17. A method as claimed in any one of Claims 13 to 16
26 wherein the method further includes the step of
27 providing a visual image of the mosaic.
- 28
- 29 18. A method as claimed in any one of Claims 13 to 17
30 wherein the method further includes the step of
31 taking a measurement from the visual image.
- 32
- 33 19. A method as claimed in any one of Claims 13 to 18
34 wherein the method includes the step of storing the

- 1 images so that they may be accessed by spatial
2 position.
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- 4 20. A method of performing a survey in a fluid, the
5 method comprising the steps of;
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- 7 (a) mounting a camera and a plurality of sensors on
8 a platform capable of movement in the fluid;
9 (b) moving the platform through the fluid while
10 recording visual images on the camera and
11 taking sensor data relating to the attitude and
12 distance of the platform from objects of
13 interest within the fluid;
14 (c) synchronising the visual images to the sensor
15 data to provide corrected visual images
16 relating to a fixed distance and attitude;
17 (d) video mosaicing the images to form an accurate
18 video mosaic as a visual image of the scene
19 surveyed.
20
- 21 21. A method as claimed in Claim 20 wherein the method
22 includes the step of precalibrating the camera to
23 compensate for distorting artefacts inherent within
24 the camera.
25
- 26 22. A method as claimed in Claim 20 or 21 wherein the
27 method includes the step of displaying the visual
28 image.
29
- 30 23. A method as claimed in any one of Claims 20 to 22
31 wherein the method includes the step of taking a
32 measurement from the visual image.
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1 24. A method as claimed in any one of Claims 20 to 23
2 wherein the platform is mounted on a remotely
3 operated vehicle (ROV).
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5 25. A method as claimed in any one of Claims 20 to 24
6 wherein the method includes the step of storing the
7 mosaiced images for viewing later.